Cornell Extension Bulletin 1007—New York State College of Agriculture

EGG ROOMS-

GRADING, PACKING, HOLDING

DAVIS, EARLE, AND OSTRANDER

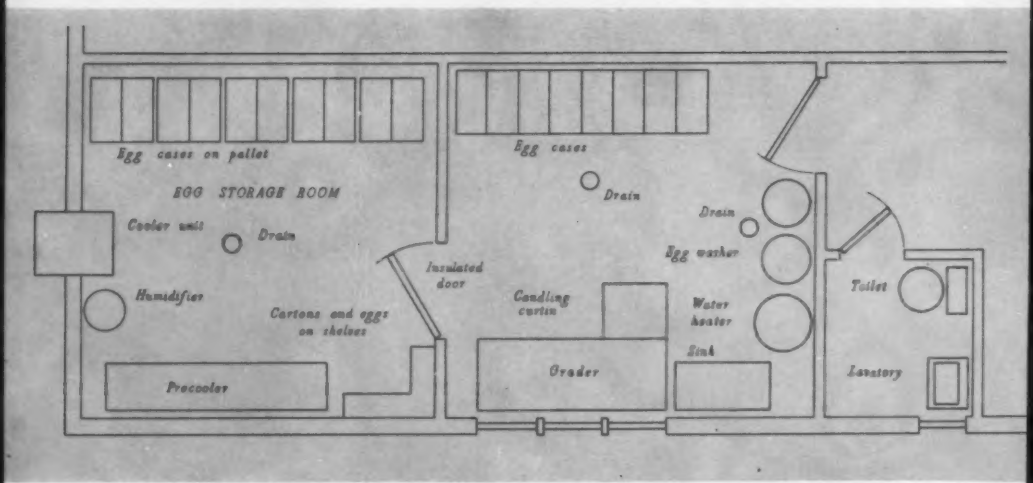

Figure 1. Suggested plan for layout of egg workroom, storage room and lavatory. Lavatories are becoming more important with the advent of more hired labor.

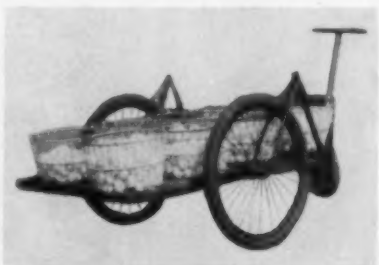

Figure 2. Three-wheeled, rubber-tired cart for transporting eggs when egg rooms are in buildings other than laying house. Large wheels make cart push easier and pneumatic tires lessen shock to eggs.

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GRADING AND PACKING ROOM

Egg grading and packing take a lot of time. At the best they are still dull, tiresome jobs—jobs that are often put off until tomorrow or the next day. A convenient, well-planned arrangement of the working space and equipment makes the jobs easier and less time consuming.

If you want to improve your grading and packing jobs, the following suggestions may be helpful.

Location

The grading and packing room should be next to the egg holding room with an insulated door between them (figure 1, inside cover). Whether these rooms should be in the cellar of the dwelling or in the laying house depends on the size of the flock, type of egg market, and location of buildings. The grading, packing, and holding rooms should be constructed near the center of the egg-gathering area, but convenient to the egg sales and shipping room. A rubber-tired egg cart (figure 2) saves time and labor when gathering eggs and carrying them to the egg room. An insulated holding room below ground level is recommended where practical. Ground temperature will help cool eggs, but additional refrigeration will be needed in warm weather. If your egg room is below ground level, be sure that the stairs are at least 4 feet wide, with the rise from 6 to 6½ inches and the tread from 10 to 11 inches. These dimensions make it easy to carry loads up and down stairs. The stairway should be well lighted and should lead directly from the egg room to the loading area.

Light and Temperature

The grading and packing room should be well lighted, both naturally and artificially. This helps in packing

uniform colored eggs together. Farmers' experiences indicate that the daylight type of incandescent or fluorescent light directly over the packing area is most satifactory. Use other lights as needed to light the room.

The temperature of the work room should be no more than 10° F. warmer than the storage room to prevent the eggs from sweating. Some poultrymen with large flocks have installed an air-conditioning unit in the egg grading room to improve working conditions during hot weather and to prevent moisture from forming on the eggs while grading and packing (Figure 3).

Size

The size of the room depends largely on the number of hens you keep. Too large a room becomes a catchall, but the room must be large enough to be convenient for the worker and for the storage of extra egg cases.

For 1,000 hens have from 80 to 100 square feet.

For 2,000 hens have from 100 to 125 square feet.

For 5,000 hens have from 125 to 150 square feet.

For 10,000 hens have from 150 to 200 square feet.

If egg sales are made from this room, add 20 percent to the above recommendations.

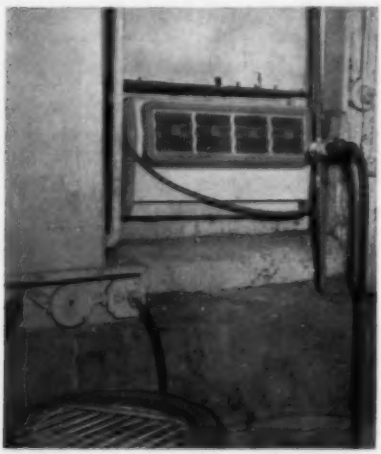

Figure 3. Air conditioner used in egg room to prevent sweating of eggs and to add comfort for workers.

Equipment Needed

500—1,000 Layers

For a small flock of 500 to 1,000 hens, you need only a work table or bench, a hand scale, a hand buffer, and perhaps a candler (figure 4). It may be well to have some benches on wheels for cases of eggs, as shown in figure 5.

1,000 or More Layers

Automatic egg sizers (graders) are practical, labor-saving items for poultrymen with 1,000 or more hens (figure 5).

Producers marketing eggs wholesale may want to consider an alternative arrangement of equipment (figure 6). The flats and fillers above the grader are within easy reach of the worker, and the bench with wheels is used to hold the egg cases.

Pallets to carry 4 or 6 cases (figure 7) ease the job of moving eggs from grader to storage to truck.

Figure 4. A handy work bench for the small flock owner who candles most of the eggs. Note candling light in center of bench. Cartons are laid out on the first shelf within easy reach. The 26-inch height is about right for the average person. Taller and shorter workers may want to change the height of the bench. Three-fourths inch lumber is used throughout the bench except for the legs which are 2x4 inch stock.

Figure 5. A combination candling and sizing operation with two workers. Behind curtain, one worker candles eggs while the second worker packs into one-dozen cartons. Note the benches on wheels for easy handling of the cases. Eggs are held in refrigerated room behind door at extreme right of picture.

Figure 6. The egg washer and automatic sizer grouped closely together save steps. Half of the egg case slides under the grader tray for easy filling. Each case is turned around to fill the other half. The washer at the right is of the immersion type. Most farm operators with 1,000 or more hens should consider a 220 volt egg washer. Many large farm operators will need two or more washers. A sanitizer-detergent should be used in the egg washer.

Plans

In the suggested plan (figure 1) the equipment is arranged for easy handling of the eggs from the time they are brought from the pens until they are packed. The flow of eggs is from washer to storage room to grader, and finally to storage until selling time. Cases and cartons should be stored in the egg-holding room for 4 or 5 days before use to provide for cooling and absorption of moisture.

Special Equipment for Large Farms With Retailing Operations

On a few farms a large part of the output is candled and cartoned. Some poultrymen buy eggs for resale. Special egg handling equipment, such as candling line and egg carton closing machines, may be required (figure 8).

Figure 7. Cases of eggs can be handled more easily and quickly when stacked on steel caster wheel pallets. Wheels should be at least 3 and preferably 4 or 5 inches in diameter.

EGG HOLDING ROOM

Money spent for an egg holding room will soon be repaid in the sales of higher quality eggs and fewer worries during warm weather. Quality starts to decline as soon as the egg is laid. An egg holding room helps to maintain the original quality placed in the egg by the hen.

Time, Temperature, and Humidity

Freshly laid eggs have a temperature of about 104° F. They must be cooled rapidly to 50° to 60° F. to maintain quality. Lower temperatures will maintain egg quality for longer periods, but are not necessary when eggs are sold weekly. The maximum time for cooling to holding temperature should be 5 to 6 hours from time of production. This means eggs need to be gathered 3 to 5 times per day.

Eggs may be placed in a precooler in flats and air blown across them. The air delivery should be from 3 cfm* to 5 cfm per dozen eggs at low velocity for not more than one hour. Egg baskets can be placed on a precooler (figure 9) and air forced through the bottoms of the egg baskets. This movement of air decreases the time required to cool the eggs.

*cubic feet per minute

Figure 8. Cartoning line on larger, more commercialized farms. Candlers place eggs in cartons and place on moving belt. Line closes and seals carton automatically.

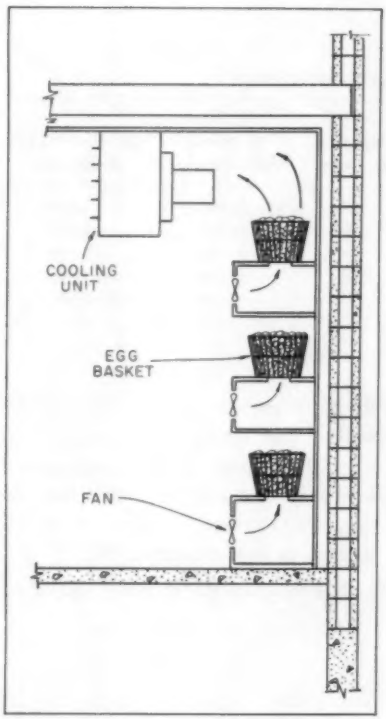

Figure 9. Precooler where egg baskets are placed immediately after gathering for quick removal of body heat. Eggs should not be left on precooler for over 1 - 2 hours.

A relative humidity of 75% to 80% should be maintained in the egg holding room by means of humidifiers or fog nozzles located in the room and controlled by humidistats. (See figure 10 for layout and wiring diagram.)

Low humidities, high temperatures, or *continuous air movement* will increase the rate of evaporation and thus increase the size of the air cell, flatten the yolk and weaken the albumen. This increases the number of lower quality eggs.

The standards for the production of good eggs are often difficult or impossible to maintain with the egg handling facilities now on many farms. A correctly designed, equipped and operated egg room will meet the standards for temperature and humidity.

Size

Size is the first consideration in designing an egg holding room. It should be based on the size of the flock, rate of production, and frequency of delivery, and should allow for future expansion of the business. The egg holding room should be large enough so that extra cases, flats, and fillers may be stored in the room and pre-cooled for 4 to 5 days. The cases, flats and fillers will absorb water from the air, so that moisture will not be taken from the eggs when cases are filled. Table 1 gives suggested dimensions of rooms for various sizes of flocks, the size of refrigeration equipment and the number of BTU's required to cool this room and the eggs.

Table 1. Size of Egg Holding Room

No. birds in flock	Egg room size*	No. of baskets per day	Capacity in cases	Approx. size of refrig. equipment	Approx. BTU's required#
1,000	8 x 8	5	15	¼ HP	2,500
2,000	8 x 10	10	30	½ HP	3,200
5,000	12 x 12	25	75	¾ HP	5,000
10,000	16 x 16	50	150	1 HP	10,000

* Once a week delivery
\# Units of heat to be removed

Insulation

Basic egg room structure may be of frame construction or blocks. An egg holding room requires that walls have a thermal resistance from 12 to 16. (figures 11 and 12). The ceiling resistances should be from 16 to 22, or about 50 percent greater than for the walls. The ability of a material to resist the passage of heat and remain relatively cool on one side while the other is exposed to heat is called thermal or heat resistance.

Any decrease in the total amount of

insulation from recommended standards increases the operating cost for refrigeration. The insulation should have a protective surface on the inside of the cooler which normally is made of asbestos cement board or other impervious materials. The outside of the cooler may be covered by a sheathing material or it may be the outside wall of the building.

Some materials resist the passage of heat much better than others (table 2). A variety of native and commercial insulating materials may be used. The results obtained from these materials depend largely upon whether they are dry and whether they maintain their volume over a long period.

Because of the variation in temperature from summer to winter, the outside wall will be the warm side during the summer, and the cool side during the winter. Thus, it is advisable to vaporproof both sides of the egg room walls (figures 11 and 12). Various vaporproof materials such as aluminum foil, laminated kraft paper 30-40-30, or rolled asphalt roofing should be installed on the studs in frame construction. Asphalt should be applied directly to the blocks in block construction. The coverings of some insulating materials themselves may be vaporproof. Care should be taken to seal all joints and to avoid puncturing the material. A drain in the center of

Table 2. Thermal or Heat-Resistance Values of Various Materials*

Material	Thermal or heat resistance of materials	
	Thickness 1 inch	Thickness as listed
Building materials		
Common wood $\frac{7}{8}$ inch thick	1.00	——
Concrete block 8 inches thick	——	1.00
Cinder block 8 inches thick	——	1.66
Cement board $\frac{1}{8}$ inch thick	——	0.46
Insulating materials		
Corkboard	3.33	——
Insulating board 7/16 inch thick	——	1.32
Foamglass	2.50	——
Styrofoam	4.00	——
Glass wool	3.70	——
Mineral wool	3.70	——
Rock wool	3.70	——
Balsam wool	3.85	——
Cotton bats—72 pounds per cubic foot	4.17	——
Sawdust	2.45	——
Shavings	2.44	——

* For a more detailed discussion of insulation values and vapor barriers, refer to Cornell Extension Bulletin 714, "Reducing Heat Leakage in Farm Buildings and Dwellings."

the egg holding room will aid in the cleaning of the egg room.

Cooling Units

Little has been said about egg room cooler units. Egg cooling units are readily available. The cooling unit should be one designed for egg rooms and not a room air-conditioning unit. As a general rule, air-conditioning units will remove moisture from the air, thereby lowering the relative humidity which should be maintained at a relatively high level. A humidifier or fog nozzles will be needed to add moisture to the room (figure 10). (Refer to table 1 for size of cooling unit needed).

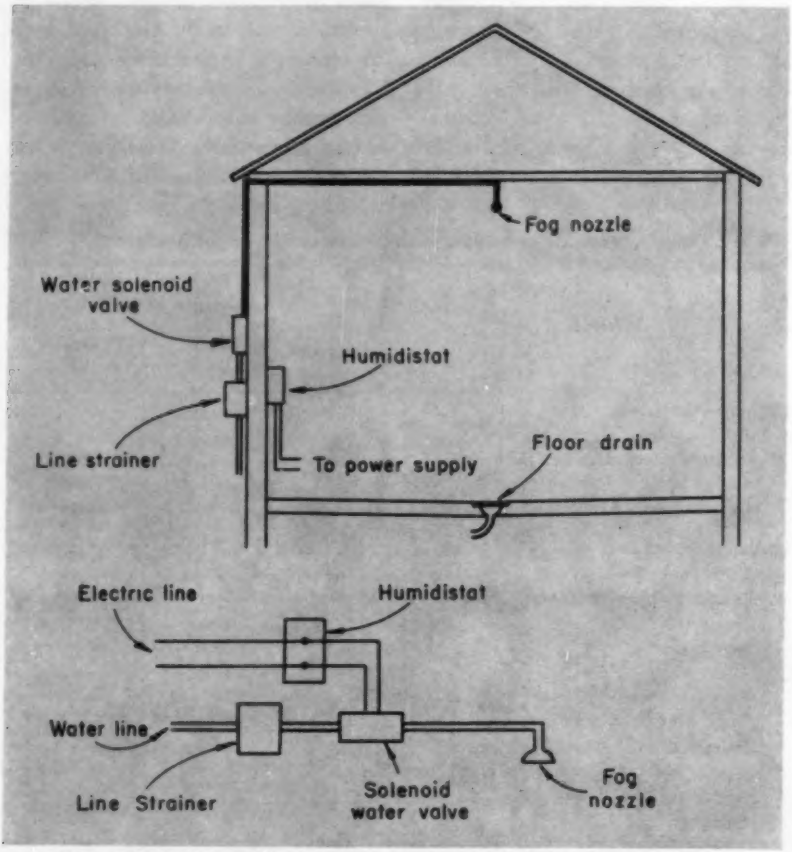

Figure 10. Fog nozzle and correct hook-up for egg-holding room.

Egg Room Management

1. Gather eggs at least 3 times daily.
2. Use small baskets for eggs to decrease cooling time and breakage.
3. Use an egg precooler.
4. Fill lower racks or shelves first.
5. Place warm eggs above cool eggs on the precooling shelves.
6. Precool egg cases and flats before packing the eggs.
7. Allow an air space between full egg cases and the wall and between full egg cases and the floor.
8. Wash and disinfect egg room once a week.

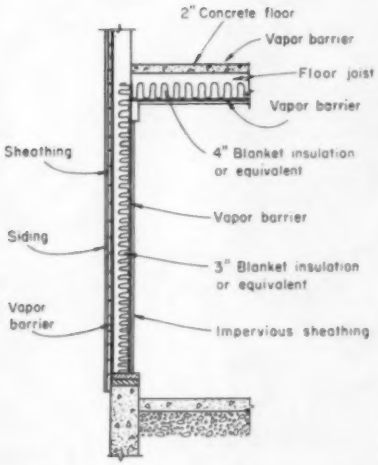

Figure 11. Section of stud frame egg room showing details of insulation, vapor proofing and construction.

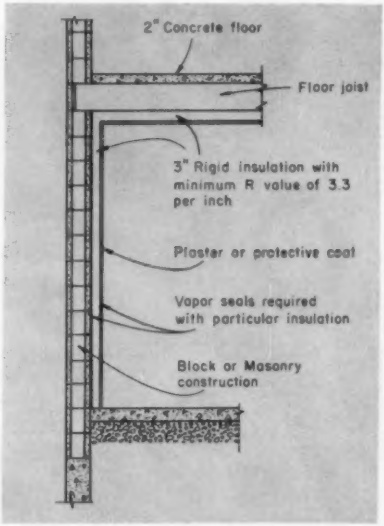
2" Concrete floor
Floor joist
3" Rigid insulation with minimum R value of 3.3 per inch
Plaster or protective coat
Vapor seals required with particular insulation
Block or Masonry construction

Figure 12. Section of block construction for egg room showing details of insulation, vapor proofing and construction.

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